

Johnson, Ken-E

From: McKenzie, Susie
Sent: Tuesday, February 05, 2013 10:11 AM
To: Johnson, Ken-E
Subject: Fw: Revised falloff test procedure for Stasta 1

Susie Lopez McKenzie, PE
EPA Region 6 (6WQ-SG)
214-665-7198 work
214-686-6056 cell
mckenzie.susie@epa.gov
----- Forwarded by Susie McKenzie/R6/USEPA/US on 02/05/2013 10:10 AM -----

From: Charles Lord <C.Lord@occeemail.com>
To: Susie McKenzie/R6/USEPA/US@EPA
Cc: Nancy Dorsey/R6/USEPA/US@EPA
Date: 02/05/2013 10:01 AM
Subject: RE: Revised falloff test procedure for Stasta 1

Susie, have you had any experience with this pressure data recorder?

<http://www.instrumart.com/products/35359/monarch-instruments-track-it-pressure-temperature-dataloggers>

Charles Lord
Program Manager UIC
Oklahoma Corporation Commission
Post Office Box 52000
Oklahoma City, Oklahoma 73152
(405)522-2751
c.lord@occeemail.com

From: McKenzie.Susie@epamail.epa.gov [mailto:McKenzie.Susie@epamail.epa.gov]
Sent: Friday, February 01, 2013 5:31 PM
To: Dorsey.Nancy@epamail.epa.gov
Cc: Tim Baker; Charles Lord; Johnson.Ken-E@EPA.GOV; dellinger.philip@epa.gov
Subject: Revised falloff test procedure for Stasta 1

Nancy,
Attached is the revised procedure Ken and I prepared for the Stasta 1 after today's conference call with OCC.

Susie Lopez McKenzie, PE
EPA Region 6 (6WQ-SG)
214-665-7198 work
214-686-6056 cell
mckenzie.susie@epa.gov

Johnson, Ken-E

From: Martinez, Omar
Sent: Monday, October 28, 2013 2:21 PM
To: hillary.young@deq.ok.gov; saba.tahmassebi@deq.ok.gov
Cc: McKenzie, Susie; Johnson, Ken-E; Dellinger, Philip; Martinez, Omar
Subject: FW: ODEQ call on Midway disposal well

Hillary:

We would like some type of agenda for the meeting and who will actually be the lead.
I will start the meeting. At this time we only have the one concern that Mid-Way has expressed.
Are there other concerns? ODEQ's concerns?

Also, I am forwarding the EPA's Adobe Connect link. You will click on the link provided below and enter as a guest. This way we (EPA) can present a PowerPoint Presentation via the internet to ODEQ and Mid-Way, if needed.

To join the meeting:
<https://epa.connectsolutions.com/midway/>

I leave at 3pm today. We can talk about this more tomorrow.

Thanks,

Omar T. Martinez
Environmental Scientist
Ground Water/UIC [6WQ-SG]
U.S. EPA / Region 6
Direct: (214) 665-8485
Fax: (214) 665-2191
Martinez.Omar@epa.gov

From: McKenzie, Susie
Sent: Monday, October 28, 2013 1:28 PM
To: Martinez, Omar; Johnson, Ken-E
Subject: ODEQ call on Midway disposal well

Please join me in an Adobe Connect Meeting.

Meeting Name: ODEQ call about Midway disposal well
Summary:
Invited By: Susie McKenzie (McKenzie.Susie@epa.gov)
When:

To join the meeting:

<https://epa.connectsolutions.com/midway/>

If you have never attended an Adobe Connect meeting before:

Test your connection: https://epa.connectsolutions.com/common/help/en/support/meeting_test.htm

Get a quick overview: http://www.adobe.com/go/connectpro_overview

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Johnson, Ken-E

From: Young, Hillary <Hillary.Young@deq.ok.gov>
Sent: Monday, October 28, 2013 10:01 AM
To: Martinez, Omar
Cc: saba.tahmassebi@deq.ok.gov; Dellinger, Philip; Johnson, Ken-E; McKenzie, Susie
Subject: RE: Midway Conference Call (10am) Thursday, October 31st, 2013

Thanks, Omar. I notified the facility last week and will pass on the conference line number whenever you send it to me.

From: Martinez, Omar [mailto:Martinez.Omar@epa.gov]
Sent: Monday, October 28, 2013 9:19 AM
To: Young, Hillary
Cc: Tahmassebi, Saba; Dellinger, Philip; Johnson, Ken-E; McKenzie, Susie; Martinez, Omar
Subject: Midway Conference Call (10am) Thursday, October 31st, 2013

Hillary:

Do not forget to call Midway to join our conference call this Thursday, October 31st, 2013 at 10am. I will have a conference line tomorrow.

Thanks,

Omar T. Martinez
Environmental Scientist
Ground Water/UIC [6WQ-SG]
U.S. EPA / Region 6
Direct: (214) 665-8485
Fax: (214) 665-2191
Martinez.Omar@epa.gov

Johnson, Ken-E

From: McKenzie, Susie
Sent: Monday, October 28, 2013 1:28 PM
To: Martinez, Omar; Johnson, Ken-E
Subject: ODEQ call on Midway disposal well

Please join me in an Adobe Connect Meeting.

Meeting Name: ODEQ call about Midway disposal well

Summary:

Invited By: Susie McKenzie (McKenzie.Susie@epa.gov)

When:

To join the meeting:

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Test your connection: https://epa.connectsolutions.com/common/help/en/support/meeting_test.htm

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Subject: Midway Conference Call (10am) Thursday, October 31st, 2013

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Omar T. Martinez
Environmental Scientist
Ground Water/UIC [6WQ-SG]
U.S. EPA / Region 6
Direct: (214) 665-8485
Fax: (214) 665-2191
Martinez.Omar@epa.gov

Johnson, Ken-E

From: Tahmassebi, Saba <Saba.Tahmassebi@deq.ok.gov>
Sent: Thursday, July 25, 2013 11:02 AM
To: Dellinger, Philip; hillery.young@deq.ok.gov
Cc: t.baker@occeemail.com; c.lord@occeemail.com; Johnson, Ken-E; Dorsey, Nancy; Martinez, Omar; Grafton, Martha E.
Subject: RE: Midway letter

Hi Phil,

Thank you so much for your efforts. Once we have had a chance to review the letter, we will contact you to discuss further.

--

-----Original Message-----

From: Dellinger, Philip [mailto:dellinger.philip@epa.gov]
Sent: Thursday, July 25, 2013 10:37 AM
To: Tahmassebi, Saba; hillery.young@deq.ok.gov
Cc: t.baker@occeemail.com; c.lord@occeemail.com; Johnson, Ken-E; Dorsey, Nancy; Martinez, Omar
Subject: FW: Midway letter

Good morning Saba and Hillary. Attached is the signed and scanned copy of the letter transmitting results of our review of responses to comments from our last review of the Midway Class I permit application. A cc to OCC was inadvertently left off the letter, but I am including them in this email as a cc. We would be glad to discuss any or all of our comments in detail. Please contact me (214-665-8324), Ken Johnson (214-665-8473), Nancy Dorsey (214-665-2294), or Omar Martinez (214-665-8485) if you have any questions. Thanks.

Philip Dellinger, Chief
Ground Water/UIC Section
EPA Region 6, Dallas, Tx 75202
214-665-8324

-----Original Message-----

From: LaBorn, Mary
Sent: Thursday, July 25, 2013 9:47 AM
To: Dellinger, Philip; Martinez, Omar; Dorsey, Nancy; Johnson, Ken-E
Subject: FW: Scanned Document

Copy of letter to ODEQ regarding Midway Environmental Services dated July 29, 2013.

Johnson, Ken-E

From: Dellinger, Philip
Sent: Thursday, July 25, 2013 10:37 AM
To: saba.tahmassebi@deq.ok.gov; hillery.young@deq.ok.gov
Cc: t.baker@occemail.com; c.lord@occemail.com; Johnson, Ken-E; Dorsey, Nancy; Martinez, Omar
Subject: FW: Midway letter
Attachments: [Untitled].pdf

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Philip Dellinger, Chief
Ground Water/UIC Section
EPA Region 6, Dallas, Tx 75202
214-665-8324

-----Original Message-----

From: LaBorn, Mary
Sent: Thursday, July 25, 2013 9:47 AM
To: Dellinger, Philip; Martinez, Omar; Dorsey, Nancy; Johnson, Ken-E
Subject: FW: Scanned Document

Copy of letter to ODEQ regarding Midway Environmental Services dated July 29, 2013.

Ray, Lauren

From: Johnson, Ken-E
Sent: Wednesday, December 09, 2015 9:34 AM
To: Ray, Lauren
Subject: FW: draft 2 Seismic Contingency Comments

From: Dorsey, Nancy
Sent: Wednesday, February 18, 2015 2:22 PM
To: hillary.young@deq.ok.gov
Cc: Ray, Lauren; Johnson, Ken-E
Subject: FW: draft 2 Seismic Contingency Comments

Hi Hillary,

I have looked at the responses to the seismic contingency NOD and revised **Seismicity Contingency Plan** and have a few recommendations. Essentially, Midway is still missing the point about not affecting the populace with strong earthquakes, if their well is potentially adding to the number and severity. ODEQ may wish to emphasise the point by requiring Midway to shut-in the well until restarting is permitted by ODEQ in writing. That would perhaps follow discussions with OCC and their handling of wells under their jurisdiction in the area.

Deficiency Sections 3 and 4

I highly recommend dropping the specified magnitude type, or mention of the Richter scale. These are not always synonymous in the sources to be used. OGS and USGS vary the type of magnitude 'M' according to the size of event and other factors. For example, OGS just changed a lot of their reporting, now it varies mostly between ML and MW. I recommend the simple fix of dropping the word 'Richter' and dropping the subscript 'L'. Magnitude would then simply refer to 'Magnitude as reported by OGS or the preferred magnitude reported by the USGS catalog'. Comcat is the current USGS consortium catalog, but they do periodically change them.

Austin Holland, OGS, sent a document to OCC on December 11, 2014 describing how the changes in OGS tracking of magnitude could affect their traffic light system. I recommend talking with both Austin and Charles Lord on their current system and potential changes.

Deficiency Section 4

With respect to the table in the Response to Deficiencies letter, I recommend deleting it for the following reasons:

- The first line is covered by the second, (a 3 mile radius within the 10 mile radius with no other changes).
- There is no indication of how the information will be reported or when (it may be in the main document).
 - What and how does ODEQ want to see the data?
 - A table listing the events (date, time, magnitude, location (lat, long, depth) and error margins (in all directions—which will vary by source).
 - A plot of cumulative earthquakes (one line or by magnitude groups) versus date and injection (volume or pressure or one with each).
- The distances are not sufficient.
 - OCC uses 10 km/6 miles as the radius of interest.
 - USGS event accuracy is rarely smaller than a mile, OGS event(s) are generally better located, but accuracy is always variable.

OCC is continually revising their system. At the moment, they issue an interim order requiring additional actions in their traffic light system. Their 'yellow' asks for daily monitoring of 'rate and magnitude' of any seismicity within the radius of interest. (Originally 3 miles, now 6.)

Red Light conditions = well shut-in

- an M3.4 within the radius;
- Weekly background seismicity of greater than M2 within the radius increases by 20% or more above the average based on the formula. Sometimes they have defined the formula between a specific time and a shorter distance—based on discussions with Austin Holland.

$$20\% \text{ Increase} = \frac{\text{Current weekly rate} - \text{previous swarm avg daily rate}}{\text{previous swarm avg daily rate}}$$

Resuming operations after a red light condition is subject to Ddirector authorization, with possible additional restrictions.

FYI, I understand OCC is about to change to a set volume reduction for all wells in the 6 mile radius, in order to resume injection. It is a moving target.

Revised Seismic Contingency Plan

Paragraph two: Suggest changing the phrase 'The majority' in the lead sentence, to something like 'A large cluster'. Earthquake occurrence is a rapidly changing target at this time; there is no clear majority location.

Section 2.2 Paragraph 3. As USGS records (maybe) down to M2 overall, no conclusions can be drawn for anything below that magnitude. It is inaccurate to say that earthquakes below M1.0 are rare, when they are simply not generally recorded by USGS. Lower magnitude is a function of the spacing and number of monitor stations. OGS has greatly increased the number and reduced the spacing of their network in the last few years. Limiting the tracking to M1 and up is acceptable...it does not need justification. Tables 1 and 2 are not needed, unless the OGS data are summarized for Oklahoma.

Section 2.4 is contradictory ('...is not known to be seismically active...') to Section 1.0, paragraph 2, '... known to be seismically active,...' Section 1.0, paragraph 2 is correct.

Section 3.0. Midway is still missing the point about not affecting the populace with strong earthquakes.

Feel free to call me if you have any questions.

Nancy

Nancy S. Dorsey
Environmental Scientist
Oklahoma Class II Program Manager
WQ-SG EPA Region 6
1445 Ross Ave. #1200
Dallas, TX 75202-2733
214-665-2294
FAX 214-665-2191

Johnson, Ken-E

From: Martinez, Omar
Sent: Friday, March 14, 2014 12:38 PM
To: saba.tahmassebi@deq.ok.gov; hillary.young@deq.ok.gov
Cc: Dellinger, Philip; Graves, Brian; Overbay, Michael; Johnson, Ken-E; Dorsey, Nancy; Martinez, Omar
Subject: Midway Conference Call

Saba & Hillary:

March 20th, 2014, from 10am – 11:30am will work with everyone here at the office. I will send the call-in conference number on Monday (March 17th). If you have any questions please give me a call.

Have a Great Weekend.

Thanks,

Omar T. Martinez
Environmental Scientist
Ground Water/UIC [6WQ-SG]
U.S. EPA / Region 6
Direct: (214) 665-8485
Fax: (214) 665-2191
Martinez.Omar@epa.gov

Johnson, Ken-E

From: Martinez, Omar
Sent: Monday, March 17, 2014 3:32 PM
To: saba.tahmassebi@deq.ok.gov; hillary.young@deq.ok.gov
Cc: Dellinger, Philip; Graves, Brian; Overbay, Michael; Johnson, Ken-E; Dorsey, Nancy; Martinez, Omar
Subject: RE: (Call-In Number) / Midway Conference Call

Saba & Hillary:

The call-in conference line is as follows:

1. Dial 1-(866) 299-3188
2. When prompted, enter the conference code 2146658485, followed by the # sign
3. Tell who you are

Our scheduled conference call is Thursday, March 20th from 10:00am to 11:30am. If you have any questions please give me a call or if you have problems connecting to the conference, my cell number is provided below.

Thanks,

Omar T. Martinez
Cell: (817) 876-8364

Environmental Scientist
Ground Water/UIC [6WQ-SG]
U.S. EPA / Region 6
Direct: (214) 665-8485
Fax: (214) 665-2191
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Ground Water/UIC [6WQ-SG]
U.S. EPA / Region 6
Direct: (214) 665-8485
Fax: (214) 665-2191
Martinez.Omar@epa.gov

Johnson, Ken-E

From: Martinez, Omar
Sent: Friday, March 07, 2014 12:39 PM
To: Dellinger, Philip
Cc: Johnson, Ken-E; Dorsey, Nancy; Overbay, Michael; hillary.young@deq.ok.gov; saba.tahmassebi@deq.ok.gov; Martinez, Omar
Subject: Tentative Date for Conference Call with ODEQ on Midway

Phil:

I spoke with Hillary this morning (Fri/March 7th) on at time for a conference call to discuss Midway. Saba and her will be available on Thursday, March 20th, from 10:00am to 11:30pm. I do not think we will go longer than one hour, but just in case. Please let me know if this time works for everyone.

Thanks,

Omar T. Martinez
Environmental Scientist
Ground Water/UIC [6WQ-SG]
U.S. EPA / Region 6
Direct: (214) 665-8485
Fax: (214) 665-2191
Martinez.Omar@epa.gov

Johnson, Ken-E

From: Tahmassebi, Saba <Saba.Tahmassebi@deq.ok.gov>
Sent: Thursday, October 31, 2013 12:14 PM
To: Johnson, Ken-E
Subject: RE: EPA presentation from 10-31-13 Midway conference call

Thanks Ken.

--

From: Johnson, Ken-E [mailto:Johnson.Ken-E@epa.gov]
Sent: Thursday, October 31, 2013 12:05 PM
To: Young, Hillary; Tahmassebi, Saba
Cc: Martinez, Omar; McKenzie, Susie; Dellinger, Philip; Graves, Brian
Subject: EPA presentation from 10-31-13 Midway conference call

Saba –

Here is the powerpoint file from this morning's conference.

Ken Johnson, P.E.
U.S. EPA R6 Ground Water/UIC Section
1445 Ross Avenue
Mail Code 6WQ-SG
Dallas, TX 75202-2733
214-665-8473 Office
972-754-6854 Cell
214-665-2191 Fax
johnson.ken-e@epa.gov

Johnson, Ken-E

From: Johnson, Ken-E
Sent: Thursday, October 31, 2013 12:05 PM
To: hillary.young@deq.ok.gov; saba.tahmassebi@deq.ok.gov
Cc: Martinez, Omar; McKenzie, Susie; Dellinger, Philip; Graves, Brian
Subject: EPA presentation from 10-31-13 Midway conference call
Attachments: Review of Midway Injector Falloffs revised.pptx

Saba –

Here is the powerpoint file from this morning's conference.

Ken Johnson, P.E.
U.S. EPA R6 Ground Water/UIC Section
1445 Ross Avenue
Mail Code 6WQ-SG
Dallas, TX 75202-2733
214-665-8473 Office
972-754-6854 Cell
214-665-2191 Fax
johnson.ken-e@epa.gov

Johnson, Ken-E

From: Tahmassebi, Saba <Saba.Tahmassebi@deq.ok.gov>
Sent: Wednesday, October 30, 2013 2:25 PM
To: Martinez, Omar; Young, Hillary
Cc: McKenzie, Susie; Johnson, Ken-E; Dellinger, Philip
Subject: RE: ODEQ call on Midway disposal well

Hi Omar,

I talked to Midway representatives today. The only issue on the agenda is item 8 on the NOD. They want to know where we got the high permeability (greater than a darcy) information. I told them that it was my impression that the high permeability was a results of EPA's analysis of the early time data in the pressure transient testing; that the plots indicated a stimulated wellbore. But at the same time, I told them that it was a good idea for them to hear your presentation and justification.

What they want to do is to share EPA's reasoning with their consultant (who is a professor at TU) to prepare a response.

Thanks and talk to you tomorrow.

Saba.

--

Saba Tahmassebi, Ph.D., P.E.
Chief Engineer
Land Protection Division, DEQ
Phone: (405) 702-5142
Fax: (405) 702-5101
Saba.Tahmassebi@deq.ok.gov

From: Martinez, Omar [mailto:Martinez.Omar@epa.gov]
Sent: Monday, October 28, 2013 2:21 PM
To: Young, Hillary; Tahmassebi, Saba
Cc: McKenzie, Susie; Johnson, Ken-E; Dellinger, Philip; Martinez, Omar
Subject: FW: ODEQ call on Midway disposal well

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We would like some type of agenda for the meeting and who will actually be the lead.
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To join the meeting:

<https://epa.connectsolutions.com/midway/>

I leave at 3pm today. We can talk about this more tomorrow.

Thanks,

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Direct: (214) 665-8485
Fax: (214) 665-2191
Martinez.Omar@epa.gov

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Sent: Monday, October 28, 2013 1:28 PM
To: Martinez, Omar; Johnson, Ken-E
Subject: ODEQ call on Midway disposal well

Please join me in an Adobe Connect Meeting.

Meeting Name: ODEQ call about Midway disposal well
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Invited By: Susie McKenzie (McKenzie.Susie@epa.gov)
When:

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Johnson, Ken-E

From: McKenzie, Susie
Sent: Thursday, April 04, 2013 10:32 AM
To: Charles Lord
Cc: Johnson, Ken-E; Dellinger, Philip; Dorsey, Nancy
Subject: Stasta 1 Falloff Test Analysis
Attachments: Stasta 1 Falloff Test ending 2-21-13 sent to Charles Lord 2-26-13.pptx

Charles,

You can release the file containing EPA R6 analysis of the Stasta 1 Falloff Test. The analysis is attached again for your convenience. Please be sure to note the following when forwarding the analysis.

No rate data prior to the test was provided so a 130 bpd injection rate, estimated from previous monthly average reported injection rates, was assumed. Other reservoir parameters used in the analysis were based on available information in the permit documents.

Susie

Susie Lopez McKenzie, PE
EPA Region 6 (6WQ-SG)
214-665-7198 work
214-686-6056 cell
mckenzie.susie@epa.gov

Johnson, Ken-E

From: McKenzie, Susie
Sent: Thursday, April 04, 2013 9:22 AM
To: Johnson, Ken-E
Subject: FW: Stasta No. 1 falloff test
Attachments: ✓ Stasta 1 Falloff Test ending 2-21-13.pptx

Susie Lopez McKenzie, PE
EPA Region 6 (6WQ-SG)
214-665-7198 work
214-686-6056 cell
mckenzie.susie@epa.gov

From: McKenzie, Susie
Sent: Tuesday, February 26, 2013 10:18 AM
To: 'Charles Lord'; Dorsey, Nancy; Ron Dunkin; Tim Baker
Cc: Matt Skinner; Johnson, Ken-E
Subject: RE: Stasta No. 1 falloff test

Charles,
Ken Johnson and I took a look at the pressure and temperature data you obtained. Attached is our analysis of the data and assumptions made for this analysis. Give Nancy Dorsey, Ken Johnson or me a call if you'd like to discuss the information in more detail.

Thanks,
Susie

Susie Lopez McKenzie, PE
EPA Region 6 (6WQ-SG)
214-665-7198 work
214-686-6056 cell
mckenzie.susie@epa.gov

From: Charles Lord [<mailto:C.Lord@occeemail.com>]
Sent: Friday, February 22, 2013 4:24 PM
To: Dorsey, Nancy; Ron Dunkin; Tim Baker
Cc: Matt Skinner; McKenzie, Susie; McKenzie, Susie; Johnson, Ken-E
Subject:

We have instructed the Operator to begin injection again.

We plan to have him inject for 30 days and do another test.

Will talk to all on Monday, have a good weekend.

Charles Lord
Program Manager UIC
Oklahoma Corporation Commission
Post Office Box 52000
Oklahoma City, Oklahoma 73152
(405)522-2751
c.lord@occcemail.com

Johnson, Ken-E

From: McKenzie, Susie
Sent: Tuesday, February 26, 2013 10:18 AM
To: Charles Lord; Dorsey, Nancy; Ron Dunkin; Tim Baker
Cc: Matt Skinner; Johnson, Ken-E
Subject: RE: Stasta No. 1 falloff test
Attachments: Stasta 1 Falloff Test ending 2-21-13.pptx

Charles,

Ken Johnson and I took a look at the pressure and temperature data you obtained. Attached is our analysis of the data and assumptions made for this analysis. Give Nancy Dorsey, Ken Johnson or me a call if you'd like to discuss the information in more detail.

Thanks,
Susie

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EPA Region 6 (6WQ-SG)
214-665-7198 work
214-686-6056 cell
mckenzie.susie@epa.gov

From: Charles Lord [mailto:C.Lord@occemail.com]
Sent: Friday, February 22, 2013 4:24 PM
To: Dorsey, Nancy; Ron Dunkin; Tim Baker
Cc: Matt Skinner; McKenzie, Susie; McKenzie, Susie; Johnson, Ken-E
Subject:

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Oklahoma Corporation Commission
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(405)522-2751
c.lord@occemail.com

Johnson, Ken-E

From: McKenzie, Susie
Sent: Monday, February 25, 2013 12:35 PM
To: Charles Lord; Dorsey, Nancy; Ron Dunkin; Tim Baker
Cc: Matt Skinner; Johnson, Ken-E
Subject: RE: Stasta No. 1

Charles,

Do you have any idea what the injection rate(s) were prior to the falloff test for the Stasta No. 1?

We'll evaluate it with an estimated injection rate, but can revise the analysis if you have any actual data.

Thanks,
Susie

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Sent: Friday, February 22, 2013 4:24 PM
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Johnson, Ken-E

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Cc: Matt Skinner; Johnson, Ken-E
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Sent: Friday, February 22, 2013 4:24 PM
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Cc: Matt Skinner; McKenzie, Susie; McKenzie, Susie; Johnson, Ken-E
Subject:

We have instructed the Operator to begin injection again.

We plan to have him inject for 30 days and do another test.

Will talk to all on Monday, have a good weekend.

Charles Lord
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Johnson, Ken-E

From: McKenzie, Susie
Sent: Tuesday, February 05, 2013 11:38 AM
To: Charles Lord
Cc: Dorsey, Nancy; Johnson, Ken-E; Dellinger, Philip
Subject: RE: Revised falloff test procedure for Stasta 1

Charles,

We have not had any experience with this particular recorder. Ken and I looked at the specs and though the transducer is probably satisfactory in terms of data point storage and recording speed, it has some significant limitations in the resolution and accuracy, not making it ideal for a falloff test. The transducer has a maximum recording speed of 1 data set every 2 seconds which would be adequate for the falloff duration. By recording at the highest rate of 1800 data points per hour, 43,200 points could be collected during the first 24 hours. After that you could slow the recording speed down to prolong the onboard transducer storage capacity. Remember you're working with a log-log scale for test analysis so you need high speed measurements for the first part of the test and then maybe the unit could be reconfigured for longer periods between test points. Additionally, you'd want to record both the temp and pressure together (allowed by this transducer) so you could see if a temperature glitch created the anomalous pressure data or if there was actually a pressure variation, likely caused externally, such as a valve leak or offset well effect. Pressure anomalies are common, so being able to differentiate is a plus.

The limited accuracy and resolution levels of the transducer mean that it is probably not sensitive enough to measure gradual pressure changes, particularly in the latter stages of the falloff when we're trying to quantify radial flow and fault responses. The calculated values for pressure change resolution and accuracy (based on the link specifications) are shown below for various transducer pressure ranges:

Accuracy: $\pm 1\%$	550 psi gauge = 5.5 psi	2300 psi gauge = 23 psi
Resolution: 0.25%	550 psi gauge = 1.38 psi	2300 psi gauge = 5.75 psi

The repeatability appears good, but the overall transducer responsiveness is probably too limited to give a clear response on the log-log plot. You'd likely wind up with a very noisy derivative well before radial flow occurs making analysis of the test questionable. There are more accurate surface transducers available you may want to consider. For example, the SPIDR gauge (<http://www.spidr.com>) has a resolution of 0.01 psi and an accuracy of $<0.01\%$ of full scale and there is a Nan Gall quartz gauge (nangall.com) with similar specs. One contractor uses Micro-smart system (www.micro-smart.com) surface pressure recorder for the Class I falloff test requirement.

Hope this clarifies the gauge requirements. Let us know what you think.

Susie and Ken

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From: Charles Lord <C.Lord@occemail.com>
To: Susie McKenzie/R6/USEPA/US@EPA
Cc: Nancy Dorsey/R6/USEPA/US@EPA
Date: 02/05/2013 10:01 AM

Subject: RE: Revised falloff test procedure for Stasta 1

Susie, have you had any experience with this pressure data recorder?

<http://www.instrumart.com/products/35359/monarch-instruments-track-it-pressure-temperature-dataloggers>

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From: McKenzie.Susie@epamail.epa.gov [mailto:McKenzie.Susie@epamail.epa.gov]
Sent: Friday, February 01, 2013 5:31 PM
To: Dorsey.Nancy@epamail.epa.gov
Cc: Tim Baker; Charles Lord; Johnson.Ken-E@EPA.GOV; dellinger.philip@epa.gov
Subject: Revised falloff test procedure for Stasta 1

Nancy,
Attached is the revised procedure Ken and I prepared for the Stasta 1 after today's conference call with OCC.

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Johnson, Ken-E



b(5)

From: Charles Lord <C.Lord@occeemail.com>
To: Susie McKenzie/R6/USEPA/US@EPA
Cc: Nancy Dorsey/R6/USEPA/US@EPA
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